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Title: **INSULATED CONCRETE WALL FORMING SYSTEM AND HINGED BRIDGING WEBS**

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Sir:

SUBMISSION

The Applicant herein submits a certified copy of the Czech Republic priority document for the above noted United States Patent application as filed in the Czech Republic Patent Office.

Respectfully submitted,
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ČESKÁ REPUBLIKA

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Za předsedu: Ing. Jan Mrva

ÚŘAD PRŮMYSLOVÉHO VLASTNICTVÍ PRAHA

V Praze [illegible].2.2006

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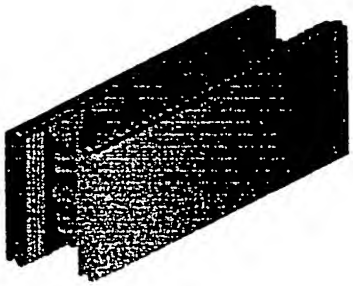
CERTIFIED COPY OF
PRIORITY DOCUMENT

Industrial Design Patent Application
for
Insulated Concrete Wall Forming System and Hinged Bridging Webs

Representative Drawing



ABSTRACT OF THE DECLARATION

The two polystyrene panels of the Insulated Concrete Wall Forming System are tied and held in a parallel relationship by polypropylene bridging webs to provide space between the panels for placement reinforced concrete. Each bridging web is comprised of three parts, namely two identical end-sections and one central section. Each of the end-sections is embedded into one of the polystyrene panels, the central section is inserted into each embedded end-section through complicated sets of hinges, bridging and anchoring the polystyrene panels into a discrete wall-form component (a block). The hinge section of the embedded bridging webs projects out of the polystyrene panels, allowing for the the movement of the two panels from a full extension equal to the width of the central-section to a completely collapsed position during transportation. **The embedded end-section of the bridging web is designed so that it can be inexpensively mass produced with a simple injection mould, without any additional intermediary procedure for creating a tubular hinges.** This design characteristic of these bridging webs is unique because it facilitates inexpensive mass production of such webs, and also, because of the two hinges, it allows the collapse of the two panels during transportation thus reducing the shipping costs.

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Insulated Concrete Wall Forming System and Hinged Bridging webs Therefore

I FIELD OF THE INVENTION

This invention pertains to a building component of a type, which is used as a wall-form for building concrete walls. The concrete wall-form is of a type comprising of pair of opposed polystyrene foam panels held in spaced and parallel relationship by a number polypropylene webs. Each pair of panels comprises a discrete wall-form element called a form or a block. Stacking together in rows the polystyrene blocks produces the wall-form and, after the cavity between the wall-form is filled with concrete, the polystyrene bonds to concrete and remains in place as insulation. More precisely, this invention relates to the bridging webs which are used to maintain the polystyrene panels at a specific distance in a parallel relationship to each other.

II BACKGROUND OF THE INVENTION

Conventionally concrete walls are constructed first by constructing wooden wall-forms and then placing concrete into the space provided them. Once the concrete hardens, the wooden wall-forms are removed and the construction proceeds to insulate and finish the walls as required. This type of construction is time-consuming and wasteful in manpower and material resources. Furthermore, high energy costs for heating and cooling requires that such concrete walls have adequate thermal insulation particularly in regions of extreme climatic conditions.

As a result of continued advancements in the construction industry, many improvements have been introduced in the past several years. New construction materials and building techniques have emerged, one of which is the Insulated Concrete Forming (ICF) System. Currently there are a wide variety of different ICF systems available on the market, all of which are used for building concrete structures.

The presented ICF System utilizes polystyrene panels to construct wall-forms for placement of concrete, which remain as part of the wall insulation. The discrete elements of this ICF System (usually referred to as forms or blocks) consist of a pair of polystyrene panels, held in spaced and parallel relationship by a number of bridging webs. These blocks are arranged in stacked rows to form a hollow polystyrene wall-form for placement of concrete. Once the concrete is placed into the cavity of the wall-form, the polystyrene panels are bonded to the hardened concrete and remain as wall insulation.

The bottom and the top surfaces of the polystyrene panels have checkerboard relief (indentations and protrusions) arranged in a mirror symmetry to each other, which fit together and act as a locking mechanism to hold the adjacent rows of panels creating a smooth and solid wall-form. These indentations and protrusions of thither top and

bottom sides are designed with a pattern, which makes them reversible. In other words, the blocks are reversible, because each side (top and bottom) are identical and interchangeable. For example, when the block is cut in half along its length, both parts are identical and interchangeable. This characteristic not only reduces significant amount of waste but also allows for making corners with any angle size.

The 90^0 corners are also reversible, that is, only a single corner is produced and is used interchangeably both as Right and as Left Corner simply by flipping it upside down. The System also eliminates the need to manufacture blocks with a variable type corner and the 45^0 corner. By cutting the standard block at half-angle of the desired corner, and flipping one side of the cut block, will produce two sections of the desired corner. For example, by cutting a standard block at an angle of 22.5^0 and flipping one part over, the cut block will produce a corner of 45^0 when the two sections are joined together at the cut surface. Similarly, a corner of any size can be made such as 30^0 and 60^0 or a corner with any odd deflection.

This unique design of the bridging web also makes it easy to produce wall-forms for different thickness of concrete core. Using identical polystyrene panels with identical embedded end-section and by simply changing a different size of central web section will produce a different concrete wall-form. That is, the same panels are used for making of 100mm concrete wall-forms as well as 150mm size concrete wall-form as well as 200mm and 250mm concrete wall-forms by simply inserting a different central web section. This characteristic eliminates the need for having a large variety of mould for making different size of wall-form, which significantly reduces the production costs.

Also having similar panels allows the construction of wall-forms with a variable concrete core width. That is, a wall can be constructed using 150mm forms for one floor and then continuing with 100mm forms for second floor while continuously maintaining a smooth external wall surface. When the forms are stacked on top of each other, the buried web portions are aligned and arranged so that they line up to form vertically continuous rigid columns over the entire width and height of the wall-form. These rigid columns totally eliminate any settlement of the polystyrene panels due to the internal weight of concrete. The webs of each layer interlock with webs of the preceding and consecutive layer, eliminating the need to tie the layers together to prevent floating and separation during placement of concrete. Such characteristics reduce the erection of wall-forms by as much as 60%.

Because the polystyrene panels are manufactured independently and not in pairs to form a block, the mould is designed so that twice as many panels are produced by one mould. Such a mould doubles the production capacity for the same machine cycle-time significantly reducing the manufacturing costs.

The polypropylene bridging webs represent the key element in this ICF System and perform the following essential functions:

1. The bridging web-sections keep the polystyrene panels in parallel attitude, providing rigidity and stability during placement of concrete,
2. When the blocks are stacked on top of the other, the embedded web-portions are aligned and arranged so that they line up vertically to form continuous rigid columns over the entire height of the wall-form. These rigid columns eliminate any settlement of the polystyrene panels which may occur due to the weight of internal concrete.
3. A grapnel-type hook at each end of the embedded end-section of the bridging web is in mirror symmetry of a grapnel hook of adjacent row of blocks, which interlocks with the bridging webs of the preceding and following layer of blocks into a stable wall-form unit, eliminating the need to tie the layers together to prevent floating and separation during placement of concrete,
4. The bridging web-assembly consists of two end-sections and a central-section. The end-sections are embedded opposite each other into each of the polystyrene panels with only the tubular section exposed. The central-section is inserted into the tubular hinge of both end-sections creating two pivoting hinges. The two hinges allow the polystyrene panels to swing/pivot and to be collapsed during transportation or storage. In this way, the volume of the forms can be reduced, allowing for about 40% more forms to be transported for the same price. The forms are assembled after the panels are expelled from the mould.
5. The bottom and the top surfaces of the polystyrene panels have checkerboard relief (indentations and protrusions) in a mirror symmetry to each other, which allows for the blocks to be reversible (top and bottom are identical), eliminating the need to manufacture corner blocks of various angles. This significantly reduces inventory size and waste during construction.
6. The embedded portion of the bridging webs is engineered and designed so that it can be mass-produced with a simple injection mould without a need for intermediary complicated procedures for creating a tubular section or hinge. This design characteristic is a unique feature, which facilitates the manufacture of such webs with an inexpensive mass-production process using only a standard injection mould. Also, because the bridging web has two hinges, this feature allows the collapse of the two block panels reducing its volume, which in turn reduces transportation costs.

Examples of Other types of Insulated Concert Wall-forming Systems are shown in the following lists of Canadian and Foreign Patents:

Canadian Patents

Werner	Nov., 1969	826584
Myhres	May, 1983	1145584

Grutsch	Feb., 1985	1182304
Oetker	Oct., 1985	1194706
Obino	Aug., 1986	1209364
Meilleur	Feb., 1988	1233042
Renauld/Georges	Apr., 1988	1234701
Krecker	Nov., 1988	1244668
Krecke	Jun., 1992	1303377
Meolleur	Jul., 1992	1304952
Beliveau	Jun., 2002	2267633
Beliveau	Jun., 1999	2292865
Beliveau	Jun., 1998	2256091
Beliveau	Jun., 1998	2235426

US Patent

Kay	Nov., 1966	3286428
McKay	Oct., 1987	4698947
Young	Mar., 1988	4730422
Boeshart	Aug., 1988	4765109
Yoings	Sep., 1989	4866891
Berrenberg	Nov., 1989	4879855
Harobin	Dec., 1989	4884382
Boeshart	Dec., 1989	4889310
Horobin	Jan., 1990	4894969
Boeshart	Jun., 1990	4936540
Boeshart	Jul., 1990	4938449
Wilson	Apr., 1991	5003746
Roby	Apr., 1992	5107648
Ritter	Oct., 1992	5154032
Mensen	Feb., 1995	5390450
Mensen	Aug., 1997	5657600

The listed patents for Insulated Concrete Wall-forming Systems have contributed to the advancement of construction methods by providing technologies which speed up the overall construction process. However, it must be pointed out that until now, none of these ICF systems have been able to present an alternative solution for the construction of concrete shell structures which can compete economically and is less costly to use than the conventional construction technique which use brick or wood in the construction of shell structures.

III SUMMARY OF THE INVENTION

It has been identified that the key component of an Insulated Concrete Wall-forming System is a bridging element (web) between the two sets of polystyrene panels which, when specifically designed and engineered, can substantially reduce

manufacturing and transportation costs, and also can provide substantial additional benefits such as:

- reduce inventory size and costs,
- improve efficiency and flexibility of the System,
- reduce waste during the construction and
- reduce the variety of building elements during construction.

The main objective of this invention is the development of bridging-webs for an Insulated Concrete Forming (ICF) System, which satisfies all of above defined characteristics and is economically competitive with other construction systems for building concrete shell structures.

The bridging-webs are comprised of three parts: two identical end-sections, each of which is embedded opposite each other into one of the polystyrene panels, and a central web- section, which is inserted into each embedded section through a tubular hinge bridging and anchoring the two polystyrene panels. The hinges of the embedded end-section projects out of the polystyrene panels, allowing for unobstructed swinging movement of the central section. The two hinges between the polystyrene panels provide a mechanism which allows for the pivoting movement of the panels where at maximum separated distance, creating a discrete element or form (block) for placement of concrete and, when panels are collapsed, for storage or during transportation.

The embedded end-section of the bridging-web has a main plate, which is completely embedded in the polystyrene and extends along the entire height of the polystyrene panel. At each end of the main plate are bearing plates, which are flush with the top and bottom surfaces of the panel and extend outward all the way to the outer surface. When the rows of blocks are stacked upon each other to form a wall-form, the bridging webs are lined up above each other and the embedded sections connect at bearing plates to form continuous solid rigid columns which make the wall-form stable and prevent any settlement of the polystyrene panels due to the internal weight of concrete.

The embedded end-section of the bridging-web also has a connector plate, which is parallel to the main plate, and is attached to the main plate by a number of ties. The connector plate is flush with the inner surface and extends along the entire height of the polystyrene panel.

At each end of the connector plate is a grapnel-type hook, each being the mirror image of each other facing inwards. When the rows of blocks are stacked, the grapnel hooks interlock, securing the entire assembly of blocks into a stable wall-form unit.

Along the exposed side of the connector plate are a number of paired half cylindrical hinges, which are alternatively placed facing inward so that each complimentary pair of half tubular hinges forms a slotted full-hinge able to hold the rod element of the central web-section. When the rod parts of the central-section are threaded through

the half cylindrical hinges of both embedded end-sections, it ties together the two polystyrene panels into a spaced and parallel position and also establishes a pair of pivoting hinges at each connection. Thus the polystyrene panels can be moved and spaced apart to the maximum width of the bridging-web to make blocks for a concrete form or folded together to conserve space during transportation or storage.

IV BRIEF DESCRIPTION OF THE DRAWINGS

The following drawings, which illustrate the Insulated Concrete Wall-forming System, are the embodiment of the invention:

- Figure 1a is a representative view of the integral building component according to the invention.
- Figure 1b illustrates a series of protrusions and depressions located on the top and bottom surfaces of each panel according to this invention.
- Figure 1c illustrates the single polystyrene panel with embedded end-sections of the connecting web.
- Figure 2a is a cross-section of the side elevation of wall-form assembly of Figure 1, showing also the upper and lower rows of stacked panels.
- Figure 2b shows a perspective view of the stacked rows of wall-form components similar to that of Figure 2a.
- Figure 3a shows a perspective view of the individual sections of a complete bridging-web according to this invention.
- Figure 3b illustrates the perspective view of the connecting web and how the central section is inserted according to this invention.
- Figure 4 shows a perspective view of the end-section of the bridging-web illustrating the detailed arrangement of the alternate hinge half-sections according to this invention.
- Figure 5 shows a perspective view of the central section of the bridging-web according to this invention.
- Figure 6 shows a perspective view of building component of Figure 1 in a partially collapsed position according to this invention.
- Figure 7 shows a perspective view of the one end-section and the central-section of the bridging-web in a pivoted position according to this invention.
- Figure 8 shows the enlargement of Figure 7 of the bias stopper of the bridging web, which prevents the central section from slipping out, according to this invention.
- Figure 9a shows the top plan view of the bridging-web of Figure 3 according to this invention.
- Figure 9b shows the perspective view of the three-section of the bridging-web in an assembled state according to this invention.

- Figure 10a shows a perspective view of the fasteners in an open position, which lock and keep together the alterative block layers according to this invention.
- Figure 10b shows the perspective view of Figure 10a in a locked position according to this invention.

VI DETAILED DESCRIPTION OF THE INVENTION

According to this invention, Figure 1a is a representative illustration of a discrete wall-form component **10** used in building of wall-forms for placement/receiving materiel such as concrete. The wall-form obtained is of the type comprising a plurality of wall-form components **10** stacked horizontally to form a wall as seen in Figure 2a and Figure 2b.

The form-wall component **10** comprises a first foam panel **12a** opposed to a second foam panel **12b** arranged in spaced and parallel relationship, and tied together by means of a plurality of bridging webs **14.** As illustrated in Figure 1a, Figure 6 and Figure 1b, the foam panels **12a** and **12 b,** comprise inner and outer surfaces **6** and **8** respectively, top and bottom **2** and **4** respectively and first and second ends **3** and **5.** Each of the top surface **2** and bottom surface **4** have a checkerboard-type relief including alternating protrusions **15** and indentations **16.** The checkerboard-type relief of the top surface **2** is in mirror symmetry with the checkerboard-type relief of the bottom surface **4** such that the top surface **2** is adapted to fit together with the bottom surface **4** of an upwardly adjacent similar foam panel **12,** as shown in Figure 2a and Figure 2b, and the bottom surface **4** is adapted to fit together with a downwardly adjacent similar foam panel **12.**

Referring now to Figures 3a, Figure 3b, and 9b each bridging web **14** comprises a pair of end-sections **20a, 20b,** the first one **20a** embedded in the first foam panel **12a** and the second one **20b** embedded in the second foam panel **12b.** Each end-section **20** has an elongated main plate **22** extending longitudinally and deep inside the foam panel **12.** Parallel to the main plate **22** and extending flush with the inner surface **6** of the foam panel **12** is a connector plate **24,** which is connected to the main plate **22** by a series of longitudinal elongated link elements **23.** Attached to each end of the main plate **22** are bearing plates **21,** which are flush with the top and bottom surfaces **2** and **4** respectively and extend to the outer surface **8** of the panel **12.**

In the making of the foam panel **12** in the manufacturing plant, the plastic foam material forming the panel **12** is injected to surround the end-section **20,** thereby strengthening the joint between the panel **12** and the end-section **20** which thus act as an anchor forming part of the foam panel **12.** More specifically and as best seen in Figure 1 c and Figure 2 a, the plastic foam material, which is preferably a polystyrene, is injected to surround the anchor member **20** such that the connector plate **24** of the end-section **20** is flush with the inner surface **6** of the foam panel **12.**

Referring also to Figure 3a, Figure 3b, Figure 5 and Figure 9b, the bridging web **14** further comprises a central-web member **30** extending between the foam panels **12**. The central- web member **30**, which is preferably made of a relatively flexible polypropylene, comprises a central portion **34** having a shape adapter to receive and hold metal bars/rods used to reinforce the concrete. The central-web member **30** further has a first longitudinal side-end **32a** connected by a hinge **26** to the connector plate **24** of the first end-section **20a** and a second longitudinal side-end **32b** opposed to the first longitudinal side-end **32a**. The second longitudinal side-end **32b** is connected by hinges **26** to the connector plate **24** of the second end-section **20b**. The foam panels **12** are movable between an extended position, as shown in Figure 1a, where the foam panels **12** are spaced apart to make the block and a partially collapsed position, as shown in Figure 6, where the foam panels **12** are brought close to each other to illustrate this function.

As shown in Figure 4, in order to connect the central-web member **30** to the end-section **20**, the bridging web **14** preferably comprises a plurality of aligned open slotted half-tube like hinges **26** positioned alternatively on the connector plate **24**. The half-tube hinged sections facing inward are designed to form series of slotted hinges for inserting the longitudinal side **32** of the central section **30** to form a pivoting hinge between end-section **20** and central section **30**. As best seen in Figures 9a and Figure 9b, each pair of half-tube hinges **26** forms an inner tube **27** having a pair of longitudinal opposed edge portions **26** defining a slot **29** in registry with the slots of the other pairs of half tube hinges, as shown in Figure 4. Each longitudinal side end **32** of the central web **30** defines a rod type shape, which is sized to fit the inner tube **27** by inserting it through the slotted half-tube sections **26** as shown in Figure 3b. Referring to Figure 5 and Figure 9b, each longitudinal side-end **32** of the central-web member **30** further defines a strip portion **31** connecting the longitudinal side **32** to a central portion **34** of the web member **30**. The width of the strip portion **31** is such that the strip portion **31** fits through the slots **29** of the end-section **20**. As best seen in Figure 5, the strip portion **31** also includes a plurality of aligned slits **36** each adapted to receive a pair of half-type hinges **26**, thereby allowing the web-member **30** and the anchor member **20** to pivot with respect to each other, as shown in Figure 7 and Figure 8. The preferred embodiment of the present invention comprises eight pairs of half-tube hinges **26** on each end-section **20** and having eight corresponding slits **36** provided on the web member **30**. Another embodiment of the present invention may have a different number of those hinges and slits.

Referring more particularly to Figure 8, the bridging web **14** preferably comprises a stopper **38** to prevent the web-member **30** from sliding out upwardly or downwardly of the knuckles **26** of the end-section **20**. More precisely, the stopper **38** consists of two elements. The first element of stopper **38** is comprised of grooves **38** positioned along each of the rod section **32** at four locations as shown in Figures 5. The second element of stopper **38** is comprised of leaf elements **25** which are positioned on the connector plate **24** in four places. When the longitudinal sides **32** of the central web

section **30** are inserted into the hinge sections **26** of the embedded end-sections **20,** the four-leaf elements **25** slide into the four grooves **38,** locking and holding the central-web section **30** into proper position vis-à-vis the embedded web-sections **20.**

Referring to Figure 4, Figures **10a** and Figure **10b,** the connector plate **24** of each end-section **20** preferably comprises an upper end and a lower end both comprising a fastener **28a** and **28b** respectively to link the anchor-member **20** to a mating anchor-member **20,** as best seen in Figures 10a and 10b. More preferably, the fastener **28** is a grapnel-type hook molded on the end of the connector plate **24** with an extremity projecting from the end of the connector plate **24.** As best seen in Figures 10a, which illustrates an open position of fastener **28** and Figure 10b, illustrates closed position of the fastener **28.** The grapnel hook **28a** linked to the upper end of the connector plate **28** is in mirror symmetry with the grapnel hook **28b** of the lower end of that connector plate **28** adapted to link with the mating end-section **20** of the bridging web **14.**

Consequently the interlocking mechanism comprised of the checkerboard-type relief of the top and bottom surfaces of the panels **14** and the fasteners **28,** the connector plate **24,** according to the illustrated preferred embodiment of the present invention can be easily stacked over each other and linked together, as shown in Figure **2b** to form a stable wall-form unit.

Referring more particularly to Figure **10a,** each fastener **28** of the end-section **20** preferably shaped so that the projecting part of the fastener **28a** fits flush into the cavity of fastener **28b** of the mating end-section **20** as illustrated in Figure **10b.**

As can be appreciated from **Figures 6** and **7,** thanks to the specific characteristics of the bridging-web **30** acording to the present invention, the panels **12** once tied with the help of those bridging-webs **14** are easily foldable with respect to one another and thus can be shipped to the site of construction in a well-compacted form.

Inasmuch as the preferred embodiment of the invention has been outlined herein in all possible details and illustrated with various accompanying drawings, it must be emphasized that the invention is not limited to this precise embodiment and that possible various changes and modifications may be introduced therein without affecting the concept or the intent of this invention.

IV THE EMBODIMENT OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVELEGE IS CLAIMED ARE DEFINED AS FOOLOWS:

What is claimed as a new invention is:

1. A bridging web for linking and fastening together two high-density polystyrene foam panels, each panel having inner and outer surfaces, top and bottom, which

are arranged in a spaced and parallel relationship to make a form for receiving fluid material such as concrete; the bridging web comprising:

two end-sections, one being devised to be embedded in one of said foam panels and the other being devised to be embedded in the other one of said foam panels, and

a central section extending between the said foam panels, the central section having opposite longitudinal side ends, each of the side ends being connectable with hinges to the said projecting end of the said end-section;

whereby the foam panels are tied together by connecting one longitudinal side end of the central section to the projecting part of one of the said end-sections and the other longitudinal side end of the central section to the projecting part of the other end-section, thereby the tied foam panels are movable between an extended position where the foam panels are spaced apart to make a discrete wall-form element (a block) and a collapsed position whereby the foam panels are brought close to each other during periods of storage or transportation.

2. A bridging web as claimed in claim 1, wherein the embedded end-section comprises

an elongated main plate extending longitudinally and deep inside the foam panel; and

having a bearing plate connected perpendicularly to one end of the main plate, being devised to be flush with the top surface and extending to the outer surface of the foam panel, and the other being connected perpendicularly to the other end of the main plate, being devised to be flush with the bottom surface and extending to the outer surfaces of the foam panel once the anchor members are embedded therein; and

a connector plate connected to the main plate by a series of elongated link elements and extending longitudinally parallel to and flush with the inner surface of the foam panel.

3 A bridging web as claimed in claim 2, wherein, a plurality of half tube-like elements placed consecutively in pairs along the length of the connector plate with each pair the half-tube hinges facing inward so that each pair of half tube-like hinge elements are offset to define a slot forming a slotted tubular hinge and are aligned with slots of the other pairs of half-tube hinge elements; and

each said longitudinal side end of the central section defines a rod with rounded ends and sized to fit the said open tube-like hinge elements and a strip portion

connecting the longitudinal side end to a central portion of the central section, the strip portion having a width sized so that the strip portion fits and can be inserted through the said slots of the tubular hinges of the end-section and including a plurality of aligned slits along the strip portion each adapted to receive a pair of half-tube hinges, thereby allowing the central-section and the end-sections of the bridging web to pivot with respect to each other.

4 A bridging web as claimed in claim 3, wherein the half-tube hinge elements consecutively placed in pairs along the connector plate with each pair of half tube hinge elements facing inward to form in pairs a complete tubular hinge, whereby the manufacture of the end-section can be accomplished with a standard injection mould without the need of an intermediary step for creating a slotted tubular hinge, thereby significantly reducing the manufacturing costs of the end-sections.

5 A bridging web as claimed in claim 1, wherein each longitudinal side ends of the central section comprises four grooves, one at each end of the longitudinal side end and two in the middle portion; and

A bridging web as claimed in claim 2, wherein four-leaf elements are perpendicularly connected to the connector plate, one at each end and two in the middle section, corresponding to the positions of said grooves on the longitudinal side of the central section, whereby as the said longitudinal end is inserted through the said tube hinges the leaf element deflect and clip into the grooves creating a biasing stopper to prevent the longitudinal side-end of the central section from sliding out of the tube-like hinges once inserted therein.

6 A bridging web as claimed in claim 2, wherein the connector plate of each end-section comprises an upper end and a lower end both comprising a fastener to link the end-section to a mating end-section.

7 A bridging web as claimed in claim 6, wherein each of said fasteners comprises a grapnel hook projecting from the end of the connector plate.

8 A bridging web as claimed in claim 7, wherein each of the grapnel hook fastener comprises a side provided with recessed hook adapted to link with the recessed hook of a mating anchor member.

9 A bridging web as claimed in claim 8, wherein the grapnel hook fastener of the upper end of the connector plate is in mirror symmetry with the grapnel hook fastener of the lower end of the connector plate.

10 A building component comprising:

First and second high density polystyrene foam panels, each having inner and outer surfaces, top and bottom, first and second ends, said foam panels arranged in spaced parallel relationship with the inner surfaces facing each other, and

a plurality of bridging webs extending between and molded into said foam panel tying the said first and second panels, each bridging web comprising:

a pair of end-sections, a first one embedded in the first foam panel and the second one embedded in the second foam panel, each end-section having:

an elongated main plate extending longitudinally and deep inside the foam panel, and a connector plate parallel to the main plate extending flush with the inner surface of the foam panel, and a central section extending between said foam panels, the central section having:

a first longitudinal side-end opposite a second longitudinal side-end, said first longitudinal side-end being connected through hinges to the projecting end of the first end-section and the second longitudinal side-end being connected through hinges to the projecting end of the second end-section;

whereby the foam panels are tied together by connecting one longitudinal side-end of the central-section to the projecting end of one of the said end-sections and the other longitudinal side-end of the central section to the projecting end of the other end-section, thereby the tied foam panels are movable between an extended position where the foam panels are spaced apart to make a discrete wall-form element (a block) and a collapsed position whereby the foam panels are brought close to each other during periods of storage or transportation

11 A building component as claimed in claim 10, wherein the main plate of each end-section comprises an upper end and a lower end both comprising a bearing plate one being connected perpendicularly to the upper end of the main plate, being devised to be flush with the top surface and extending to the outer surface of the foam panel, and the other being connected perpendicularly to the bottom end of the main plate, being devised to be flush with the bottom surface and extending to the outer surfaces of the foam panel once the anchor members are embedded therein; and

wherein the connector plate of each end-section comprises an upper end and a lower end both comprising a fastener to link the connector plate to a mating connector plate and a plurality of half tube-like elements placed consecutively in pairs along the length of the connector plate with each pair the half tube element facing inward so that each pair of half tube-like hinge are offset to form a slotted tubular hinge and are aligned with slots of the other pairs of half tube hinge elements, and

each said longitudinal end of the central section defines a rod-shaped shaft with rounded ends sized to fit said tube-like hinge elements and a strip portion connecting the longitudinal end to the central portion of the central section, the strip portion having a width sized so the strip portion fits and can be inserted through the said slots of the tubular hinges of the end-section and including a plurality of aligned of aligned slits along the strip portion each adapted to receive a pair of half tube thereby allowing the central section and the end-section to pivot with respect to each other.

12 A building component as claimed in claim 11, wherein each longitudinal side ends of the central-section and connecting plate of the end-section jointly comprise a biasing stoppers to prevent the longitudinal side ends from sliding out the half tube- like hinges during placement of concrete by having four grooves, on the longitudinal side ends of the central section, one at each end of the longitudinal side end and two in the middle portion; and four-leaf element connected perpendicularly on the connection plate one at each end of the connection plate and two in the center which snap into the grooves when the central section is inserted into the tubular hinges.

13 A building component as claimed in claim 12, wherein, the connector plate of each end-section comprises an upper end and a lower end both comprising a fastener to link the end-section to a mating end-section of the adjacent layer of blocks.

14 A building component as claimed in claim 13, wherein, each of the said fasteners comprises a grapnel hook projecting from the end of the connector plate.

15 A building component as claimed in claim 4, wherein each of the grapnel-type fasteners comprises a side provided with recessed hook adapted to link with the recessed hook of a mating connecting plate.

16 A building component as claimed in claim 15, wherein the grapnel hook fastener of the upper end of the connector plate is in mirror symmetry with the grapnel hook fastener of the lower end of the connector plate.

17 A building component as claimed in claim 10, wherein each foam panel has a top surface opposite a bottom surface, each of the top surface and the bottom surface having a checkerboard-type of relief including alternating protrusions and cavities, with the checkerboard-type relief of the top surface being in mirror symmetry with the checkerboard-type relief of the bottom surface such that the top surface is adapted to fit together with the bottom surface of an upwardly adjacent similar foam panel and the bottom surface is adapted to fit together with the top surface of a downwardly adjacent similar foam panel.

18 A building component as claimed in claim 17, the extremities of each of the fasteners of the foam panels align flush with either top surface or the bottom surface of each row of wall-forms panels.

19 A concrete wall-forming system comprising a plurality of stacked horizontal rows of wall-form assemblies as defined in claim 18.

VI DRAWINGS

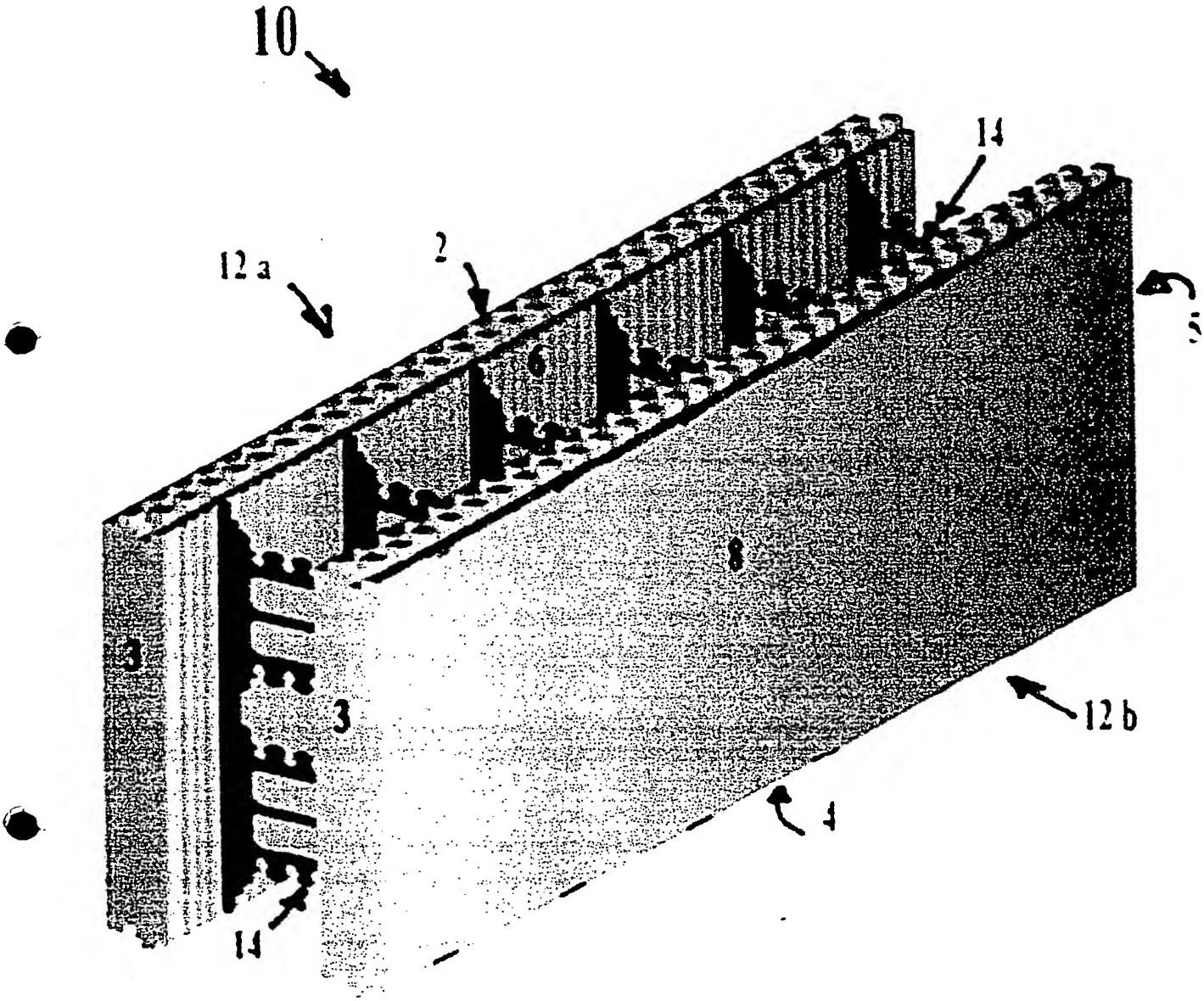


Figure 1 a

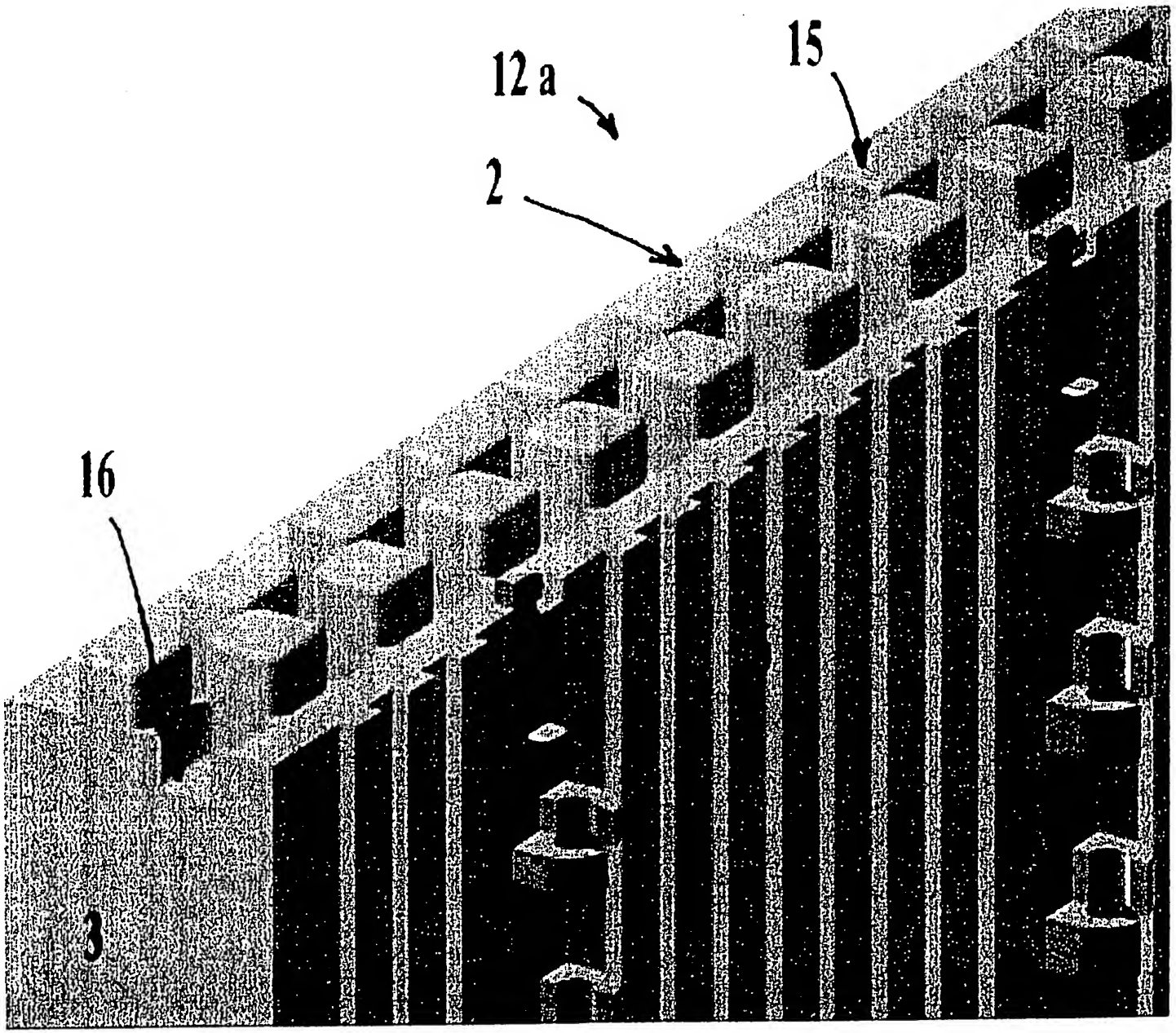


Figure 1 b

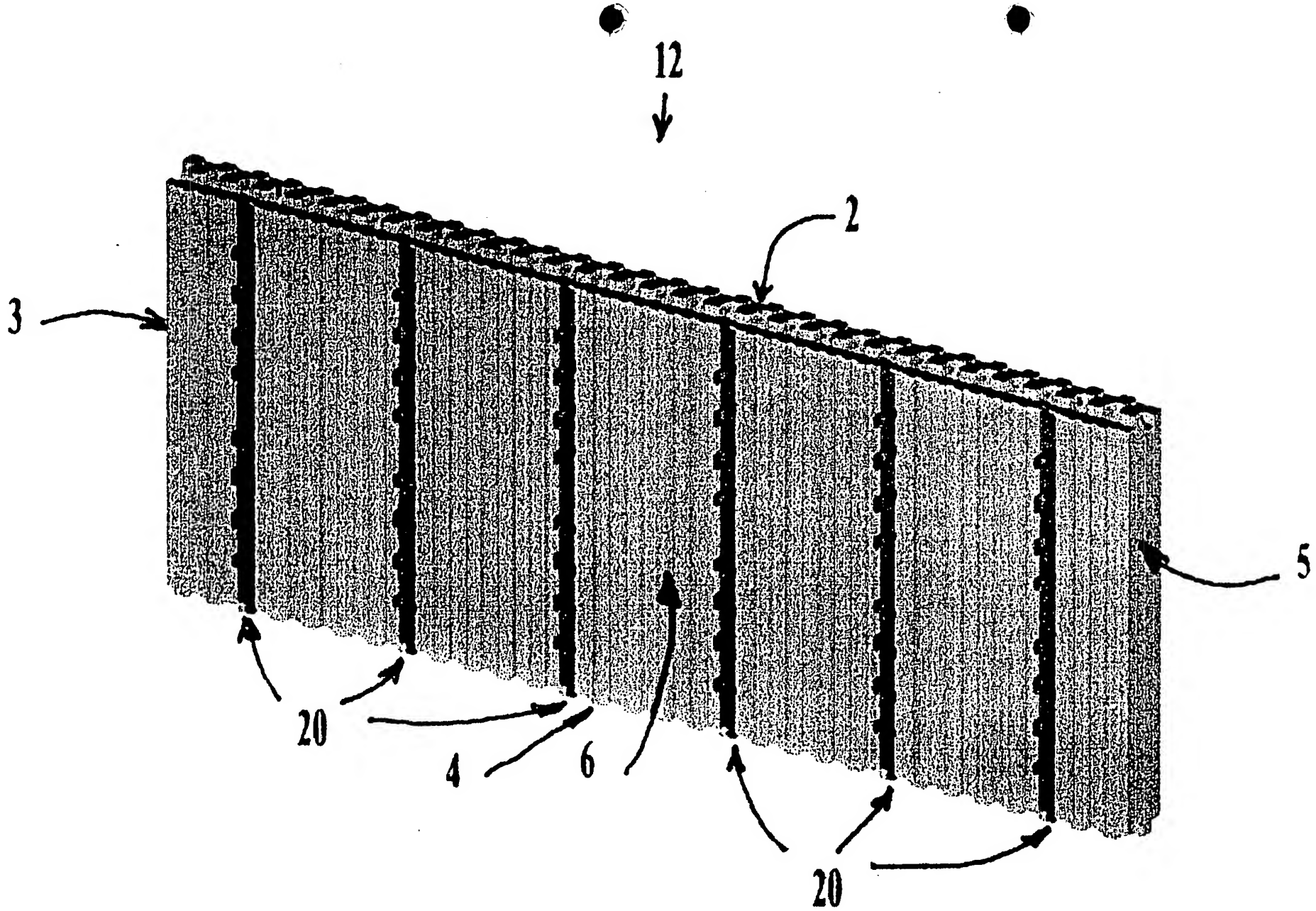


Figure 1 c

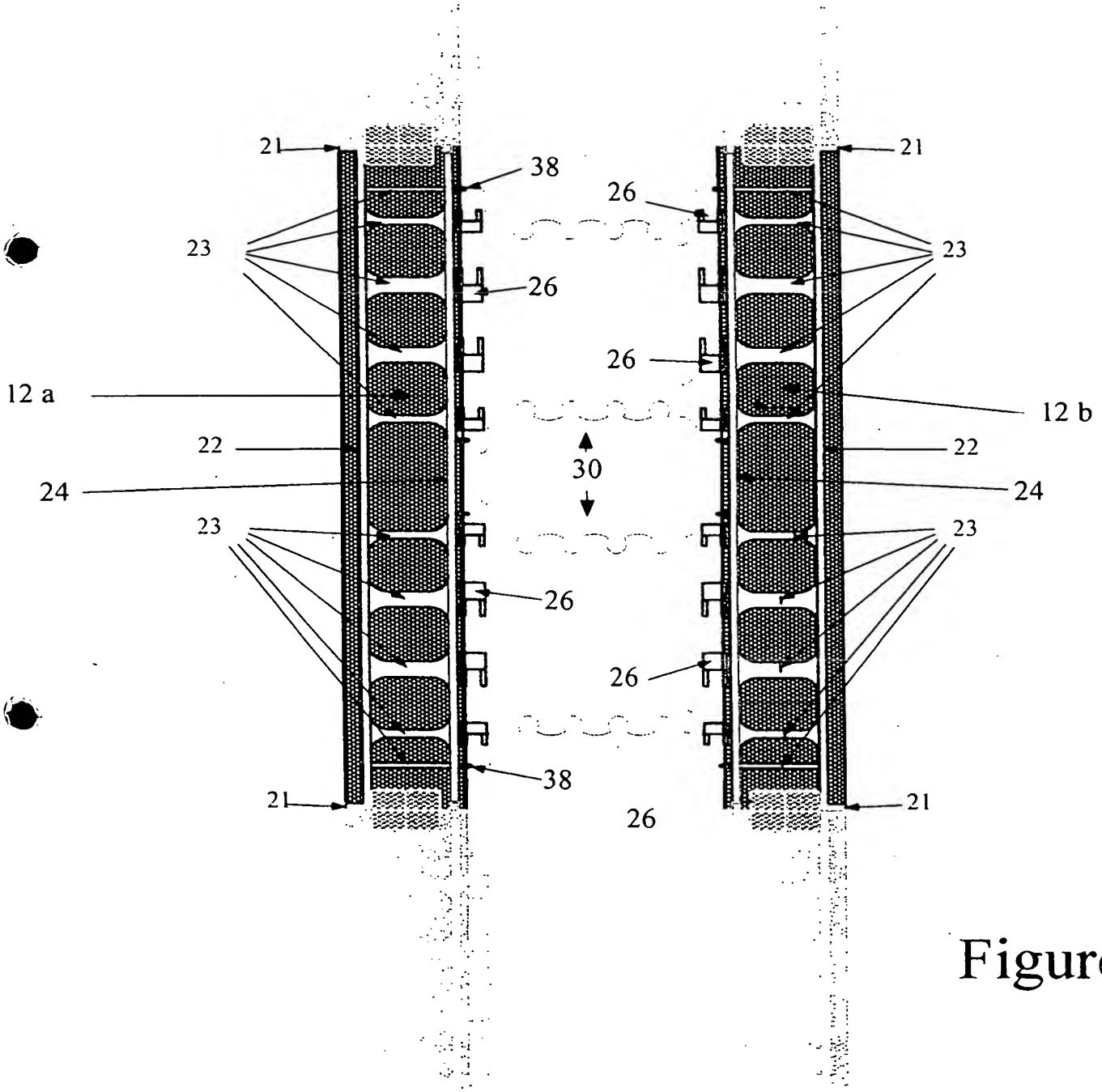
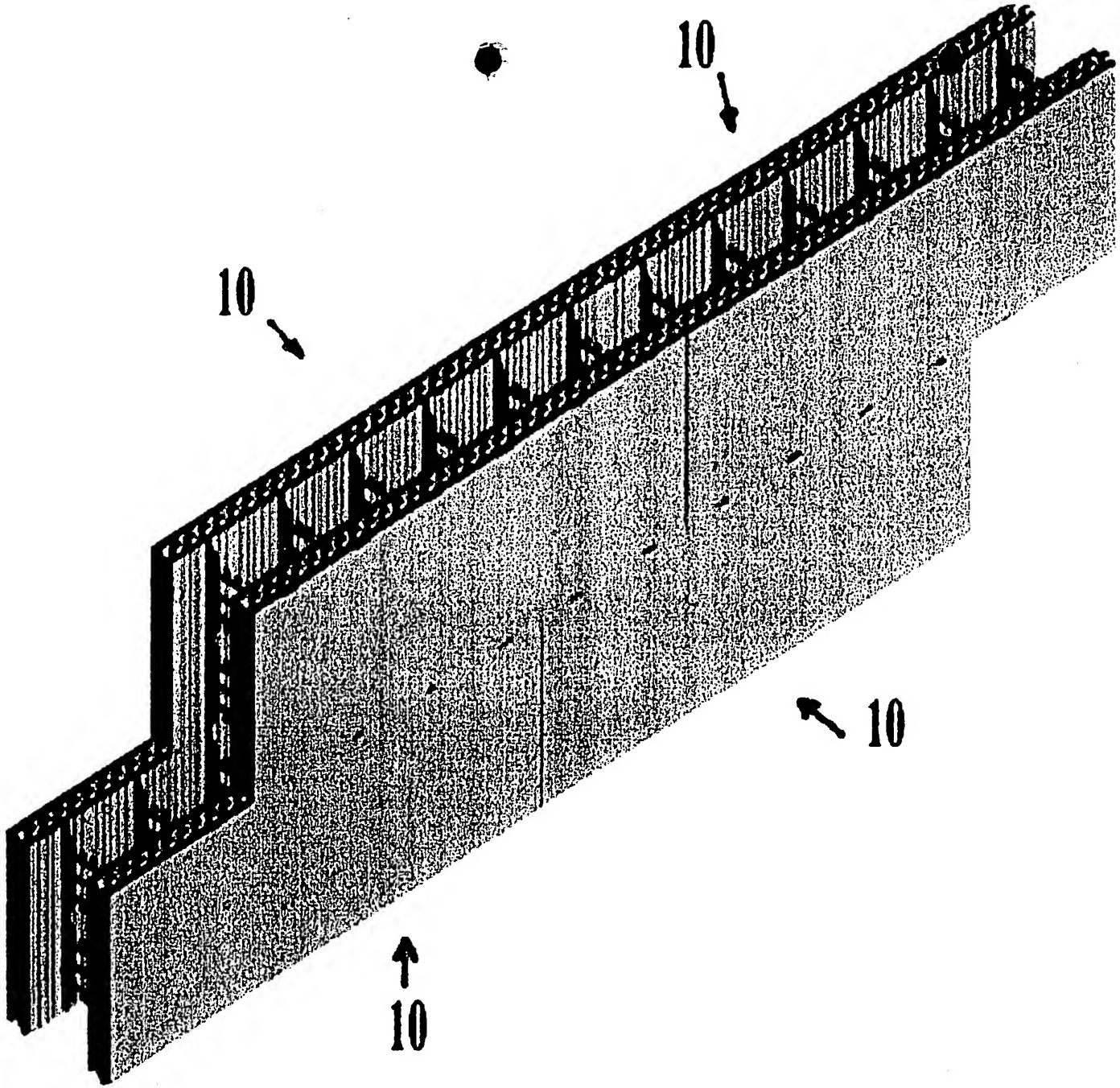


Figure 2a



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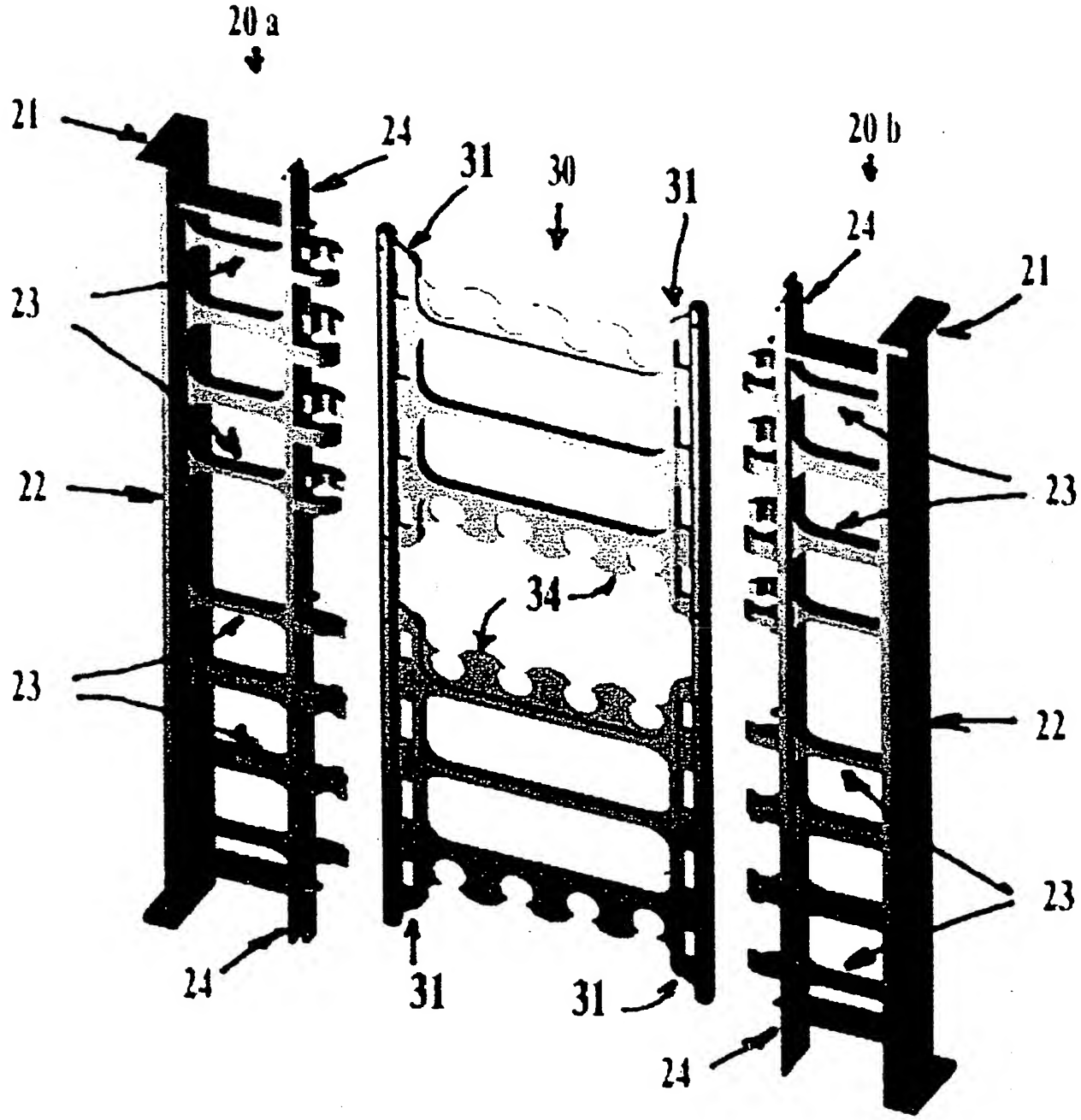


Figure 3 a

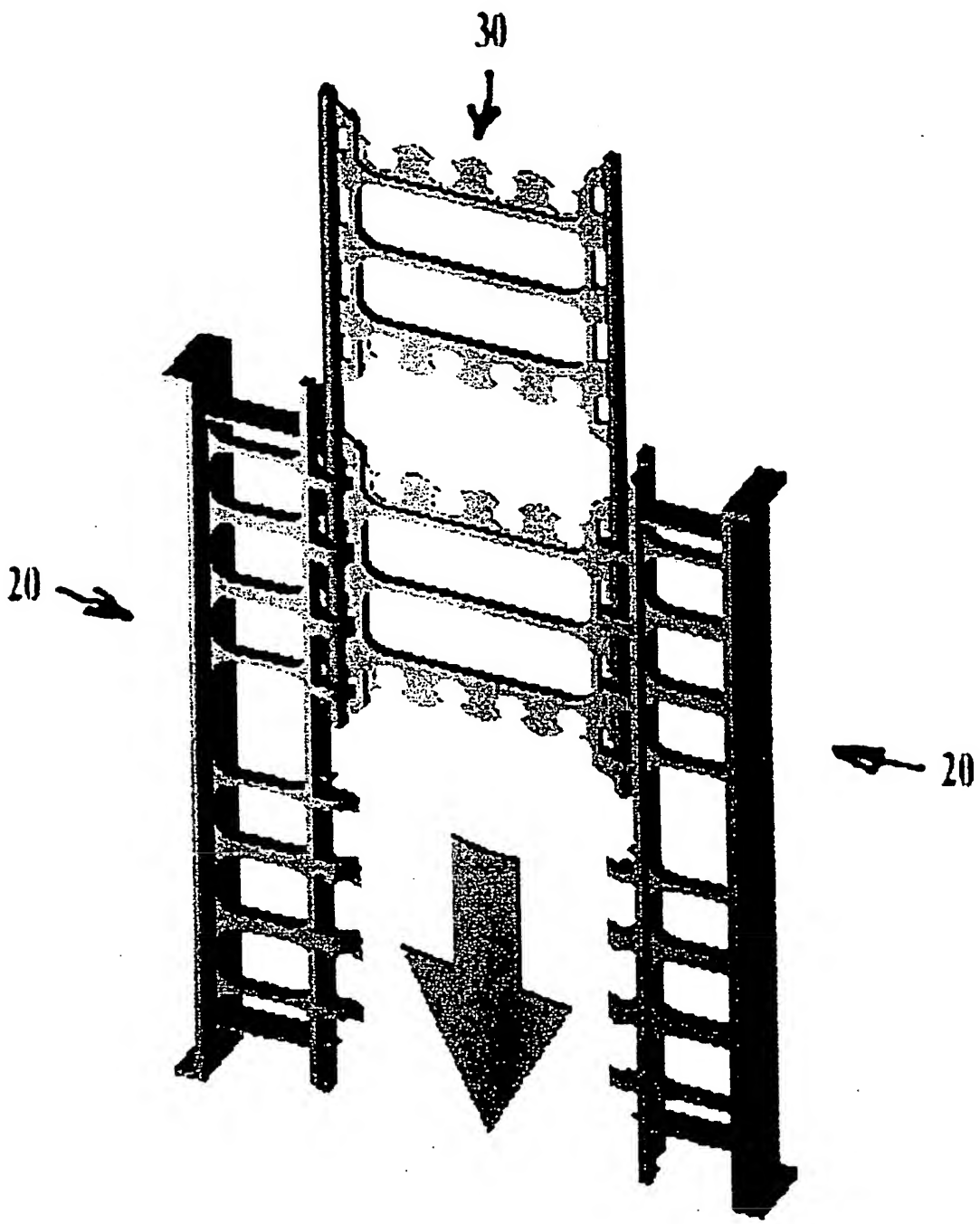


Figure 3 b

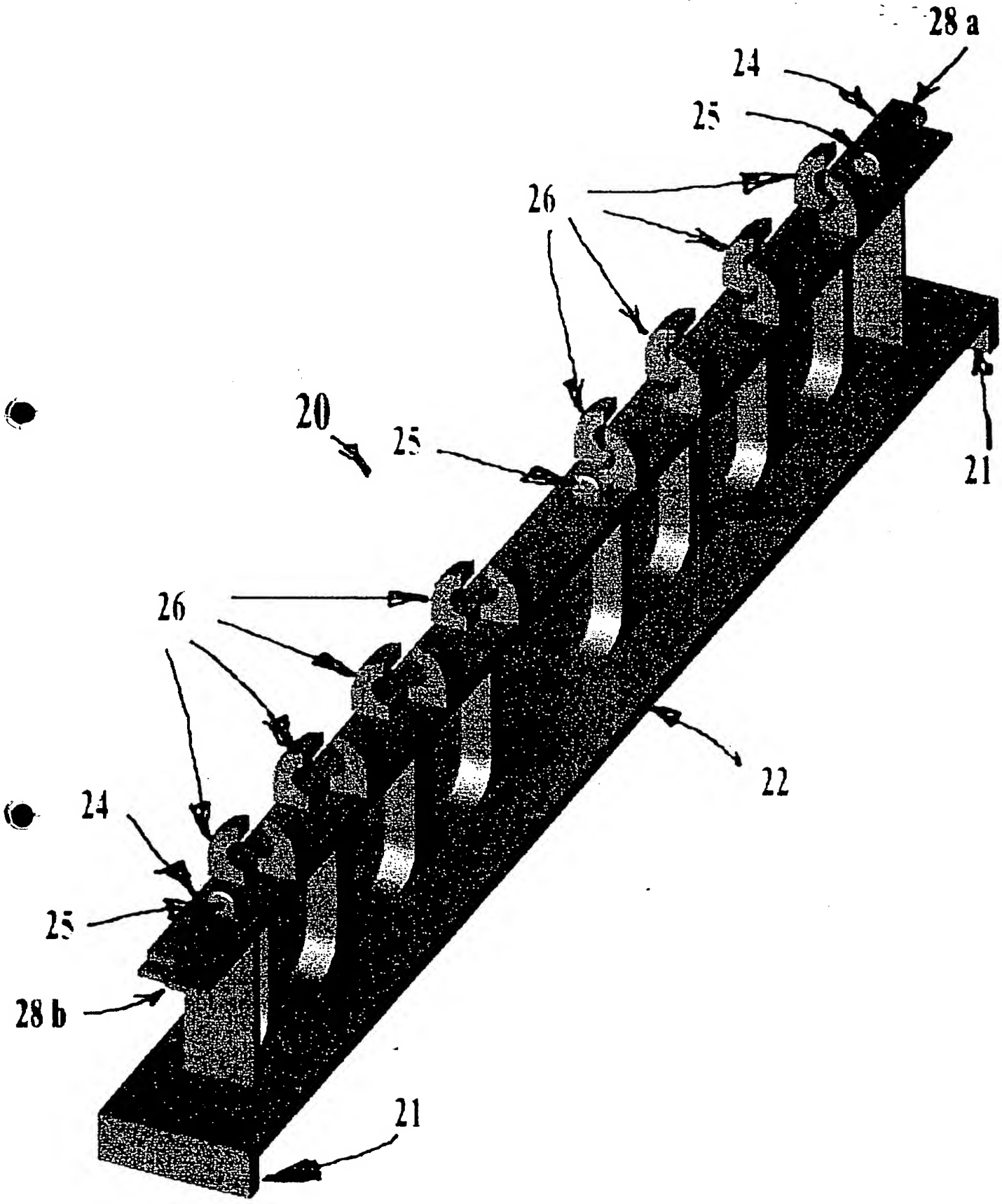


Figure 4

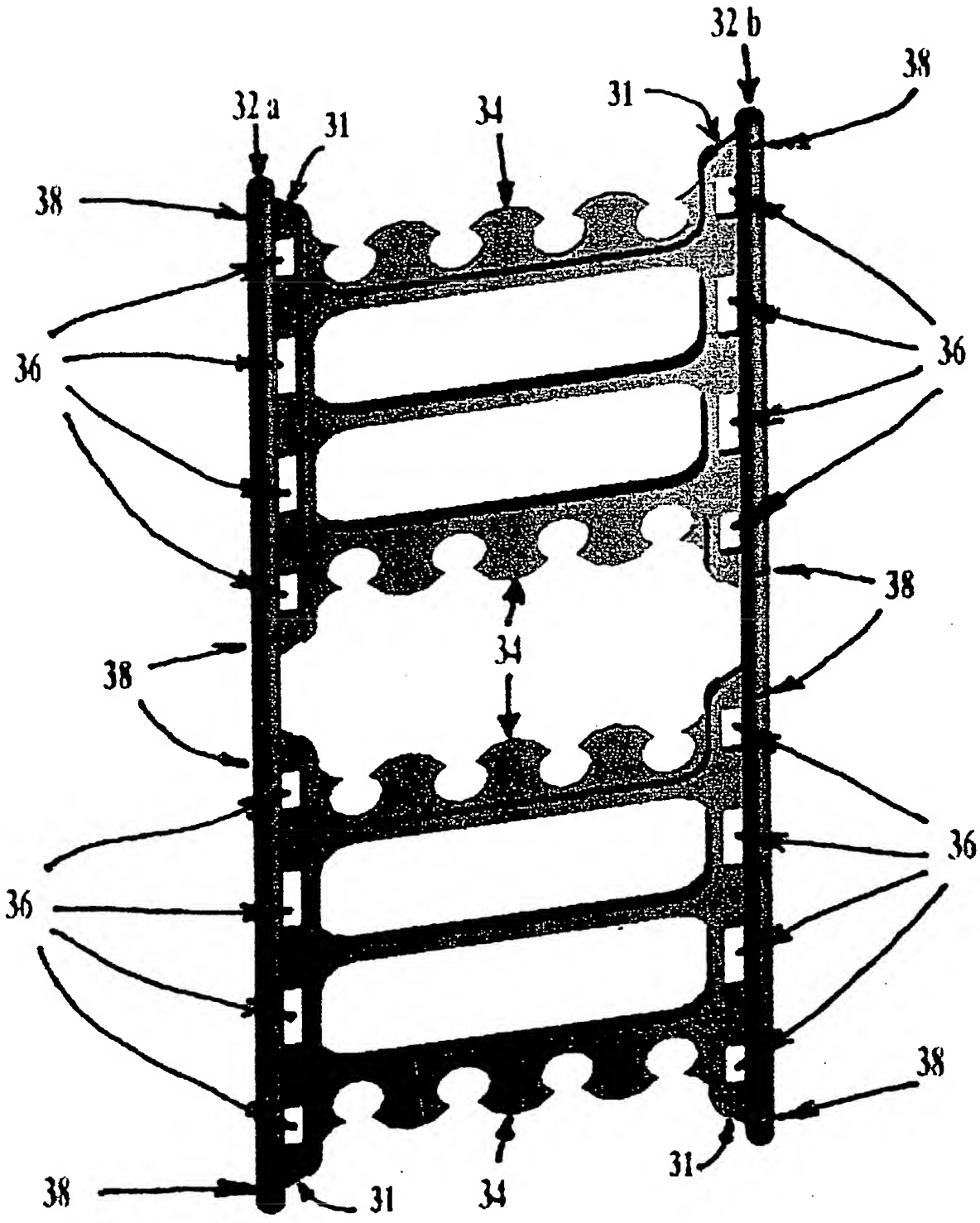


Figure 5

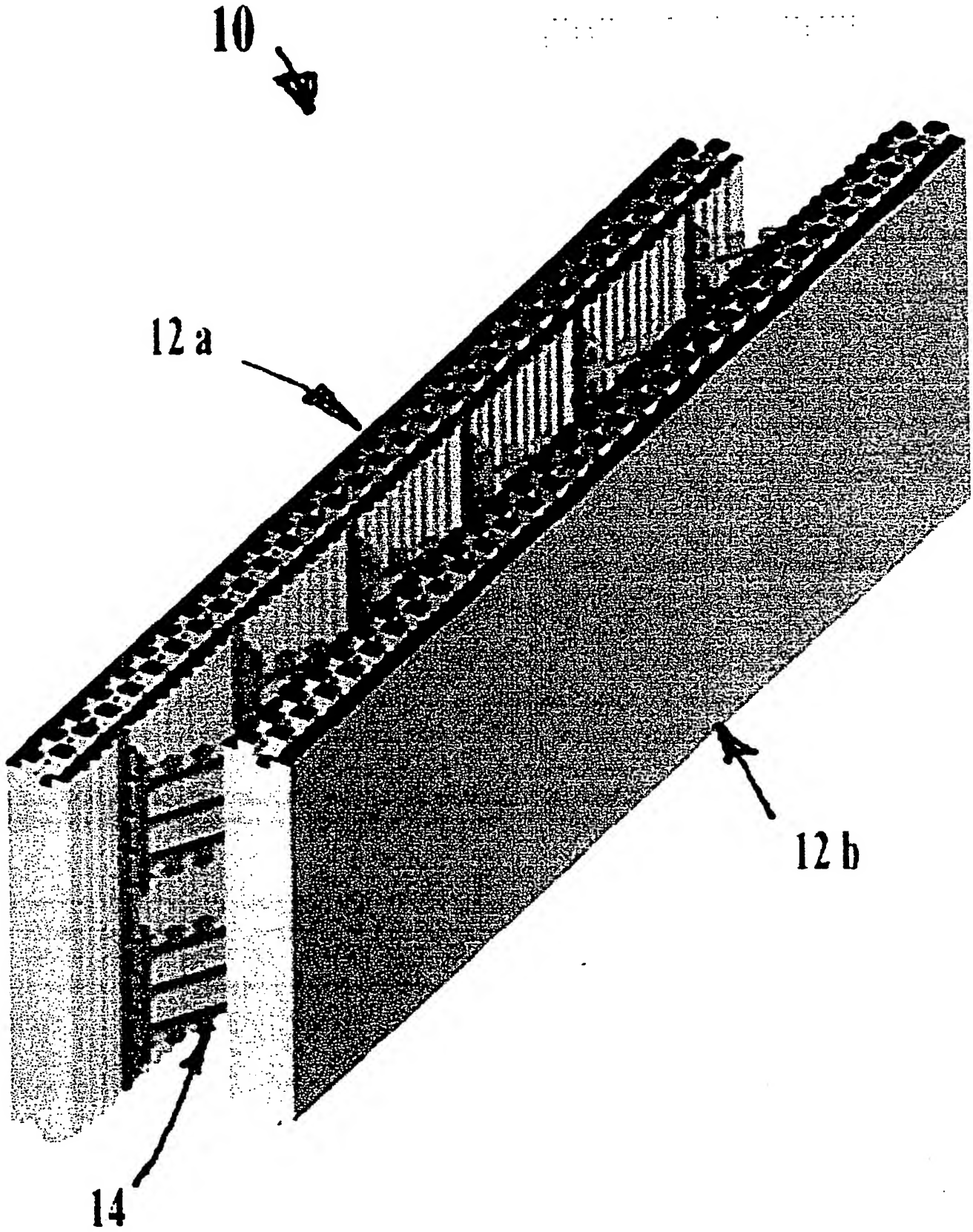
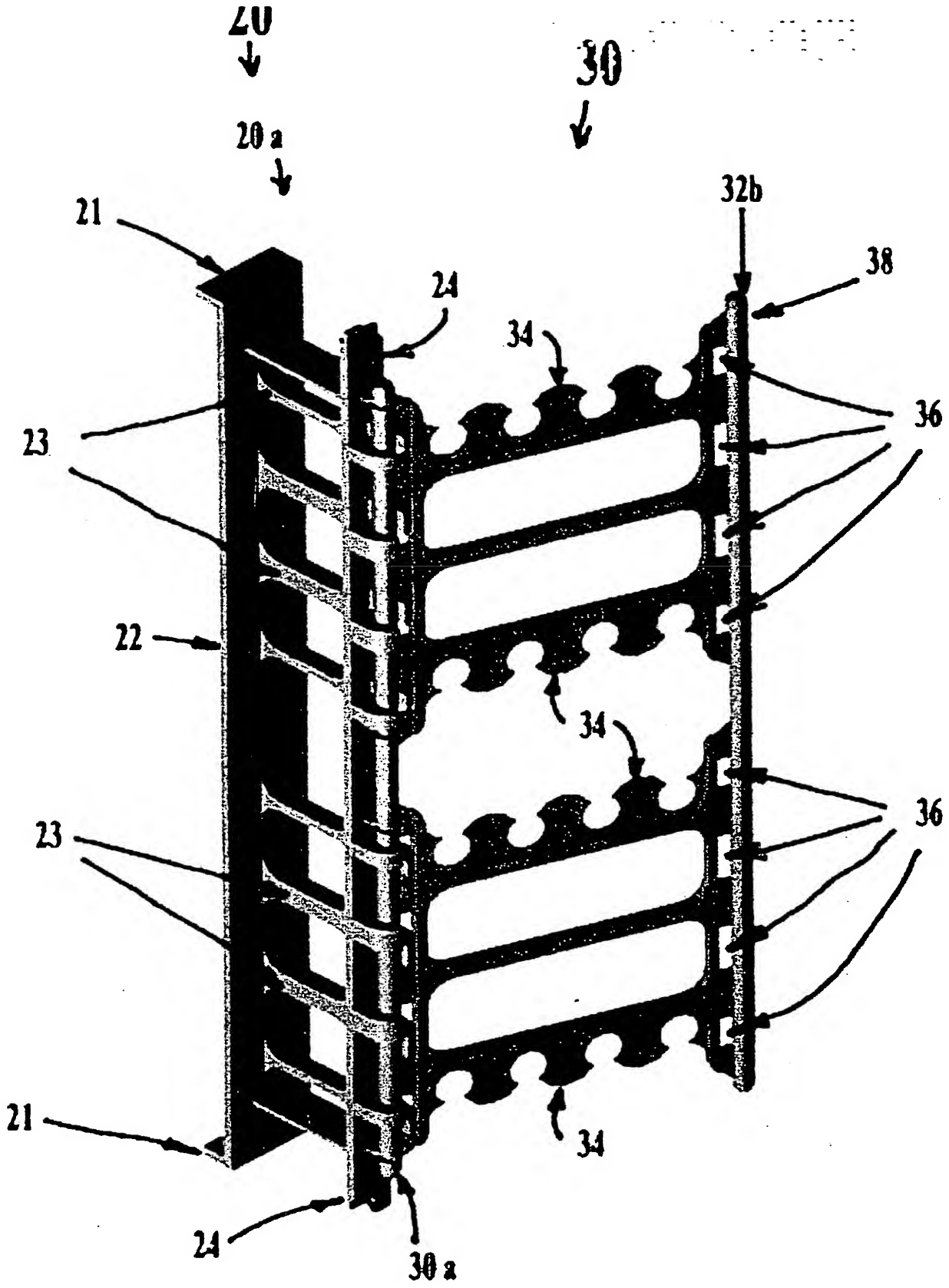


Figure 6



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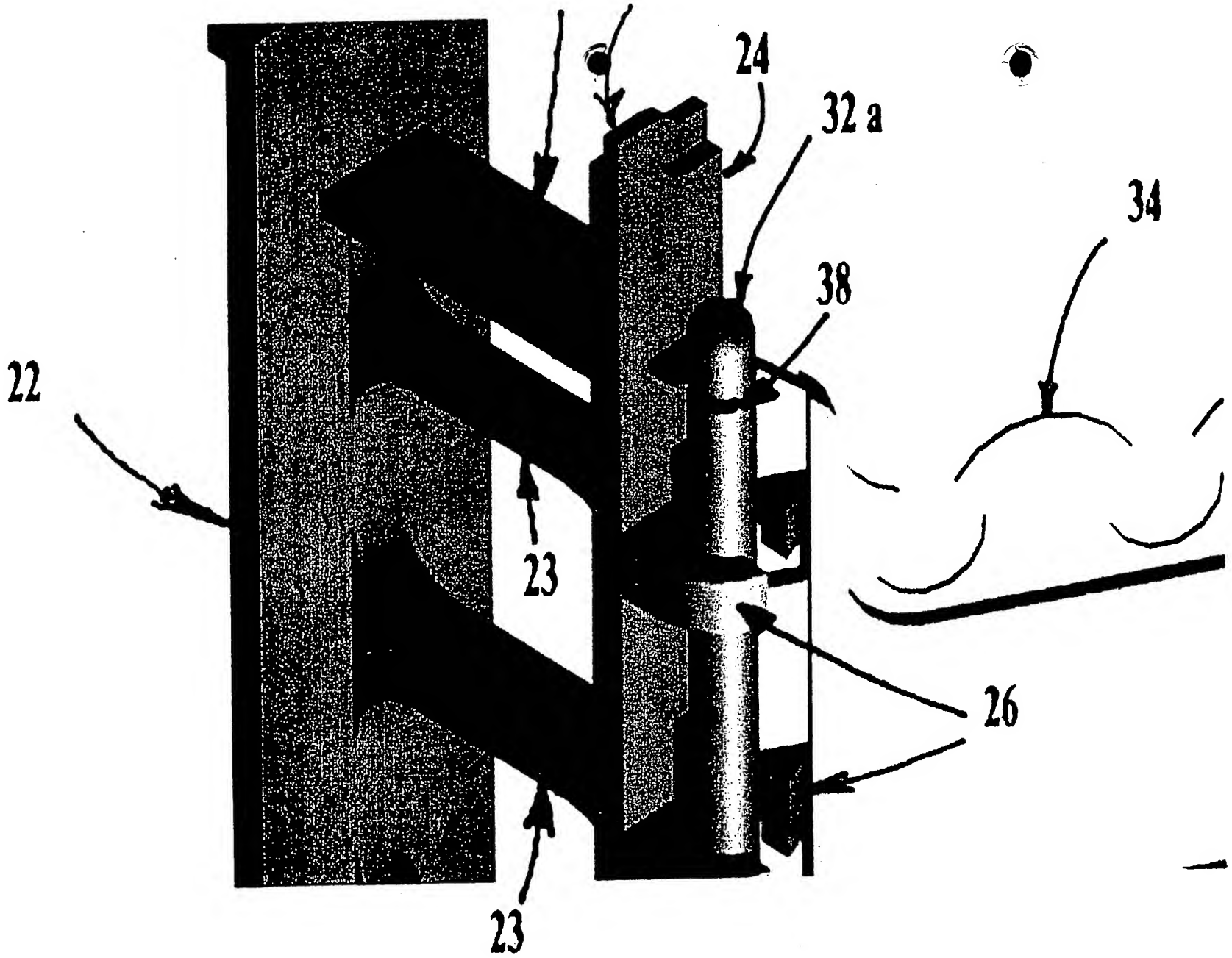

Figure 8

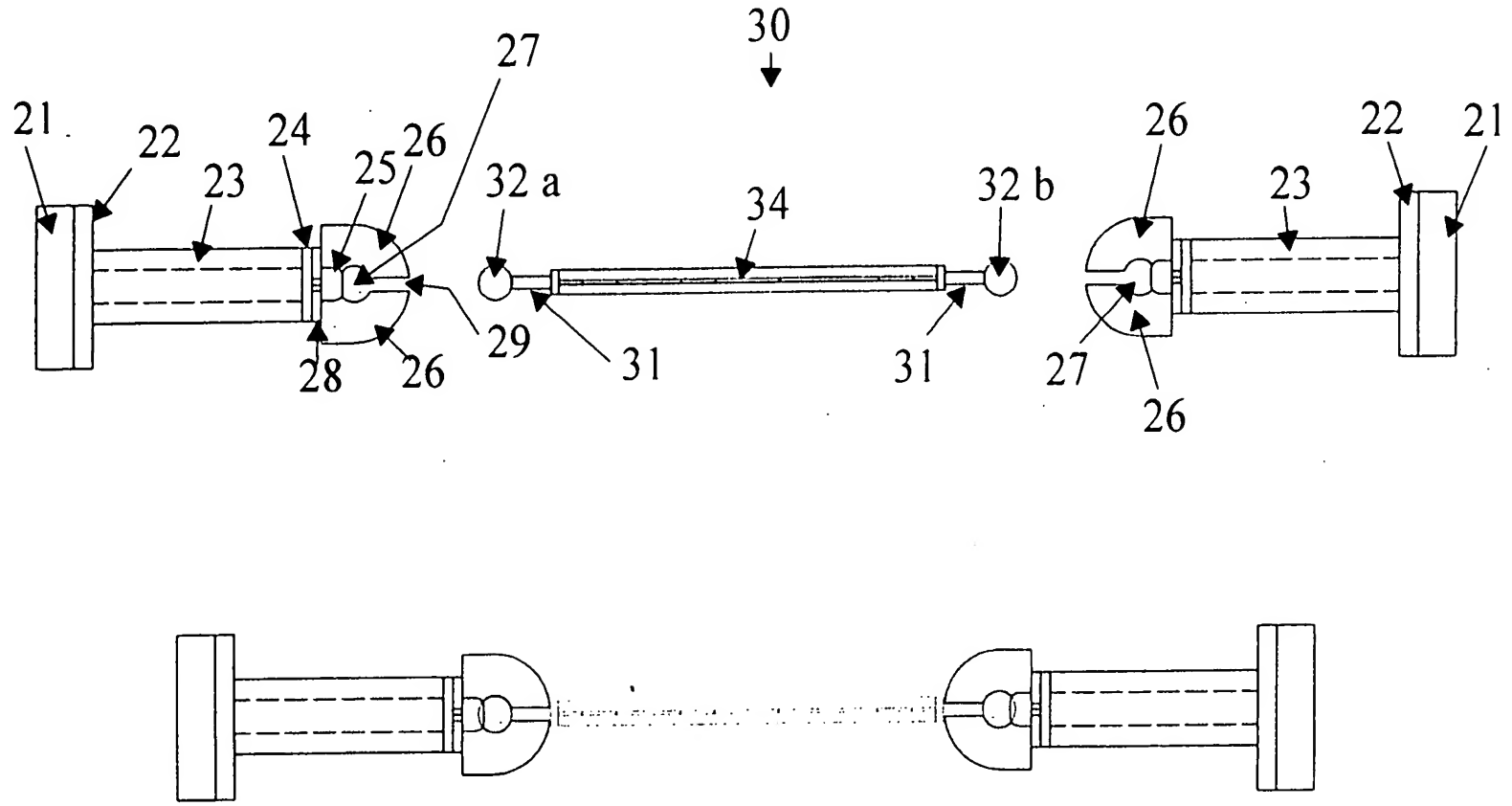

Figure 9a

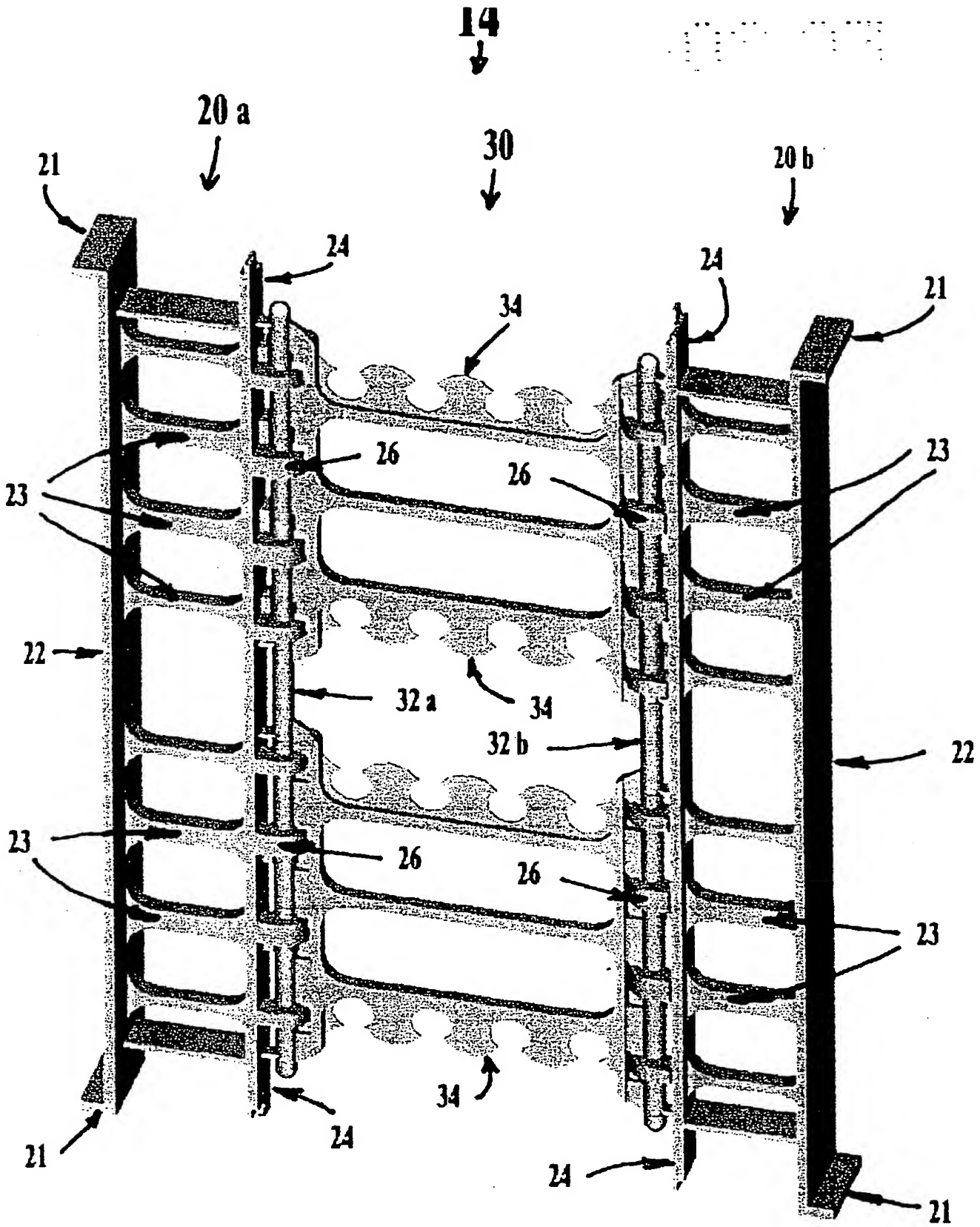

Figure 9 b

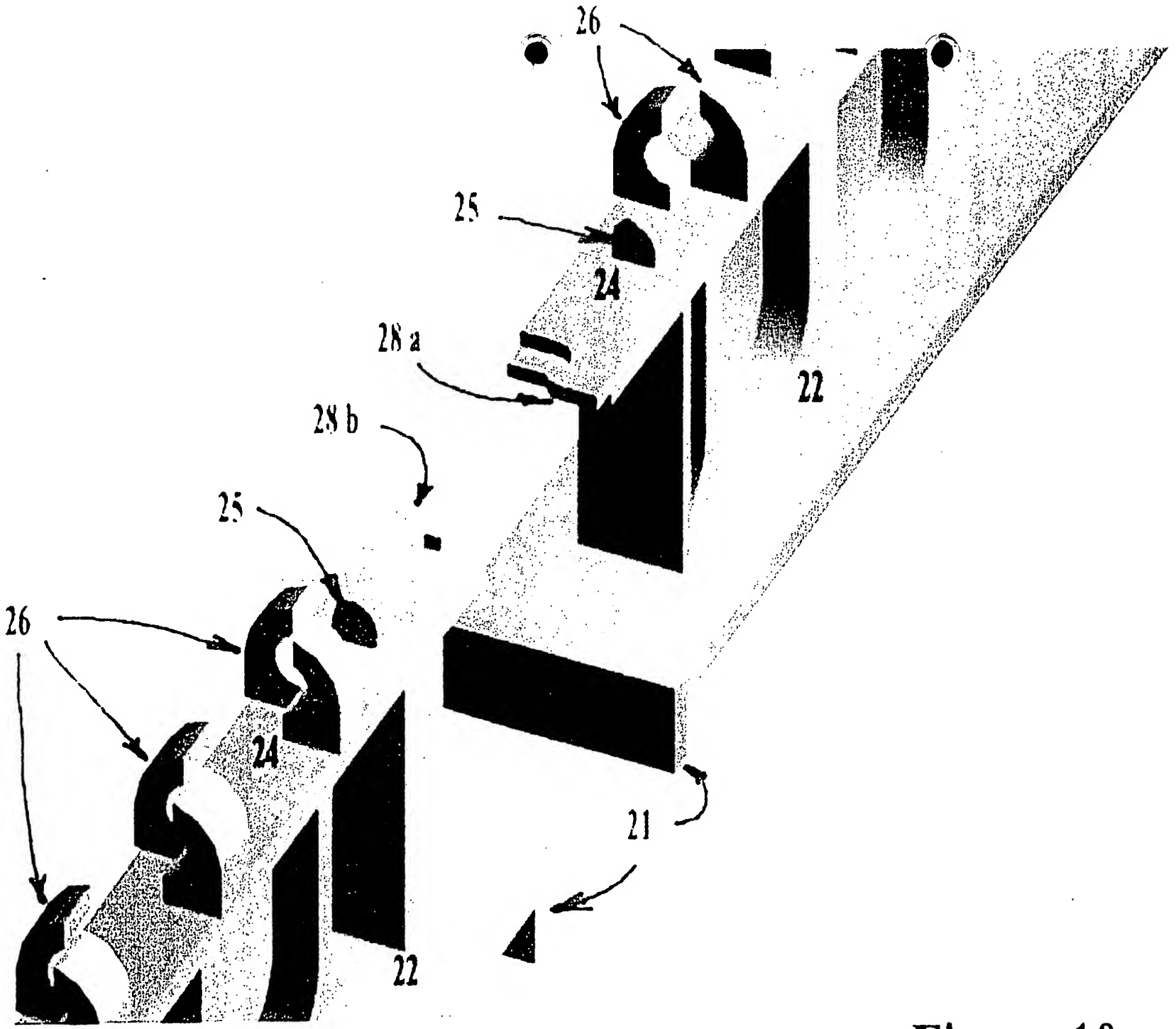

Figure 10 a

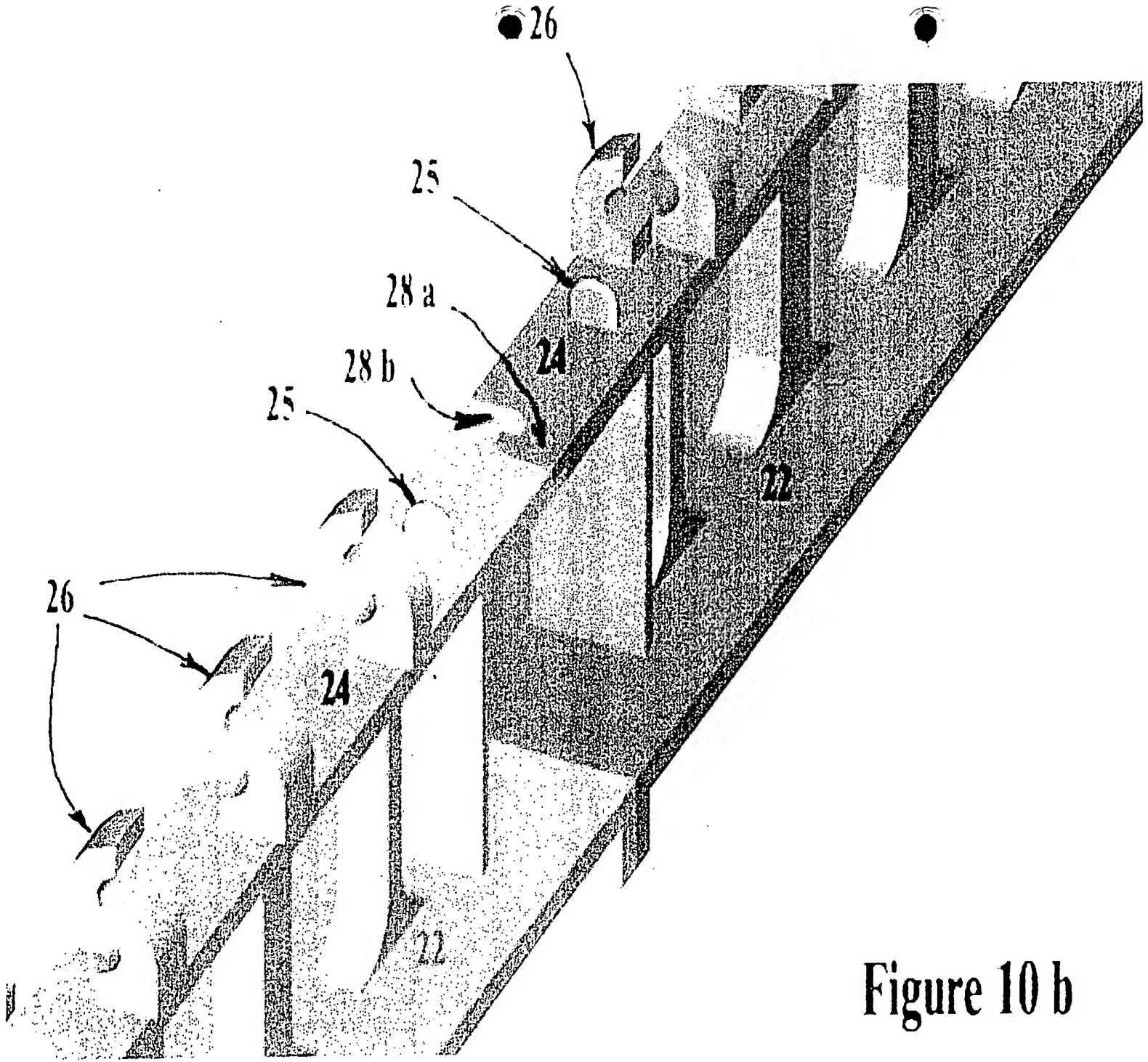

Figure 10 b